WEST

Generate Collection | Print

**Search Results** - Record(s) 11 through 20 of 22 returned.

☐ 11. Document ID: US 6267125 B1

L15: Entry 11 of 22 File: USPT Jul 31, 2001

US-PAT-NO: 6267125
DOCUMENT-IDENTIFIER: US 6267125 B1

TITLE: Apparatus and method for processing the surface of a workpiece with ozone

DATE-ISSUED: July 31, 2001

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|---|---|---|---|---|
| Bergman; Eric J. | Kalispell | MT | | |
| Hess; Mignon P. | Kalispell | MT | | |

US-CL-CURRENT: 134/102.1; 134/102.3, 134/148, 134/153, 134/902

ABSTRACT:

An apparatus for supplying a mixture of a treatment liquid and ozone for treatment of a surface of a workpiece, and a corresponding method are set forth. The preferred embodiment of the apparatus comprises a liquid supply line that is used to provide fluid communication between a reservoir containing the treatment liquid and a treatment chamber housing the workpiece. A heater is disposed to heat the workpiece, either directly or indirectly. Preferably, the workpiece is heated by heating the treatment liquid that is supplied to the workpiece. One or more nozzles accept the treatment liquid from the liquid supply line and spray it onto the surface of the workpiece while an ozone generator provides ozone into an environment containing the workpiece.

25 Claims, 6 Drawing figures
Exemplary Claim Number: 25
Number of Drawing Sheets: 6

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWMC | Draw Desc | Image

☐ 12. Document ID: US 6235122 B1

L15: Entry 12 of 22 File: USPT May 22, 2001

US-PAT-NO: 6235122
DOCUMENT-IDENTIFIER: US 6235122 B1

TITLE: Cleaning method and cleaning apparatus of silicon

DATE-ISSUED: May 22, 2001

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|---|---|---|---|---|
| Zhang; Hongyong | Kanagawa | | | JP |
| Sakakura; Masayuki | Kanagawa | | | JP |
| Goto; Yuugo | Kanagawa | | | JP |

US-CL-CURRENT: 134/2; 118/715, 118/722, 134/100.1, 134/102.3, 134/27, 134/28

ABSTRACT:

In a cleaning method and a cleaning apparatus of a silicon substrate, after wet cleaning or etching of the substrate having a silicon surface is carried out, and during or after a pure water rinse of the substrate, an oxide film with a thickness of 10 to 30 .ANG. is formed on the silicon surface by rinsing the substrate by pure water added with an oxidizer, and then the substrate is dried. Since drying is carried out after the oxide film is formed on the silicon surface, the occurrence of a water mark can be prevented.

42 Claims, 13 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 4

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | Claims | KWIC | Draw Desc | Image

---

☐ 13. Document ID: US 6227212 B1

L15: Entry 13 of 22 File: USPT May 8, 2001

US-PAT-NO: 6227212
DOCUMENT-IDENTIFIER: US 6227212 B1

TITLE: Semiconductor workpiece cleaning method and apparatus

DATE-ISSUED: May 8, 2001

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|---|---|---|---|---|
| Konishi; Toko | Tokyo | | | JP |
| Ban; Cozy | Tokyo | | | JP |

US-CL-CURRENT: 134/1.3; 134/28, 134/3, 134/33, 134/34

ABSTRACT:

A semiconductor workpiece cleaning apparatus comprises a cleaning means of a semiconductor workpiece by use of cleaning liquid, charging means of drying liquid, and discharging means of the cleaning liquid. The cleaning means cleans the workpiece by spraying chemical liquid and/or pure water in a chamber, and/or by immersing the workpiece in the chemical liquid and/or pure water. The charging means takes in drying chemical liquid or vapor into contact with the processing chemical liquid or pure water in which the semiconductor workpiece is immersed. The discharging means discharges the processing chemical liquid or pure water interfaced by the processing chemical liquid or pure water.

19 Claims, 16 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 7

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☐ 14. Document ID: US 6145519 A

L15: Entry 14 of 22 File: USPT Nov 14, 2000

US-PAT-NO: 6145519
DOCUMENT-IDENTIFIER: US 6145519 A

TITLE: Semiconductor workpiece cleaning method and apparatus

DATE-ISSUED: November 14, 2000

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|---|---|---|---|---|
| Konishi; Toko | Tokyo | | | JP |
| Ban; Cozy | Tokyo | | | JP |

US-CL-CURRENT: 134/95.2; 134/902, 134/95.3

ABSTRACT:

A semiconductor workpiece cleaning apparatus includes a cleaning arrangement that cleans a semiconductor workpiece by use of a cleaning liquid, a charging arrangement that brings into a chamber a drying liquid, and a discharging arrangement that discharges the cleaning liquid. The cleaning arrangement cleans the workpiece by spraying chemical liquid and/or pure water in the chamber, and by immersing the workpiece in the chemical liquid and/or pure water. The charging arrangement takes in the drying chemical liquid or vapor so as to contact the processing chemical liquid or pure water in which the semiconductor workpiece is immersed. The discharging arrangement discharges the processing chemical liquid or pure water while preserving an interface between the processing chemical liquid or pure water and the drying chemical liquid or vapor.

19 Claims, 16 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 7

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☐ 15. Document ID: US 5964954 A

L15: Entry 15 of 22 File: USPT Oct 12, 1999

US-PAT-NO: 5964954
DOCUMENT-IDENTIFIER: US 5964954 A

TITLE: Double-sided substrate cleaning apparatus and cleaning method using the same

DATE-ISSUED: October 12, 1999

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|---|---|---|---|---|
| Matsukawa; Hiroyuki | Kumamoto | | | JP |
| Yonemizu; Akira | Kumamoto | | | JP |
| Matsushita; Michiaki | Yatsushiro | | | JP |
| Fujimoto; Akihiro | Yatsushiro-gun | | | JP |
| Takekuma; Takashi | Yamaga | | | JP |
| Yaegashi; Hidetami | Kokubunji | | | JP |
| Fukuda; Takahide | Kumamoto | | | JP |

US-CL-CURRENT: 134/6; 134/18, 134/26, 134/32, 134/902, 15/77

ABSTRACT:

There is provided a double-sided substrate cleaning apparatus including a carrier station for loading/unloading a carrier in which objects to be processed are stored, a convey mechanism for conveying an object taken out from the carrier station, at least one cleaning mechanism, arranged along a convey path on which the convey mechanism conveys the object, for cleaning the object, and an object reversing mechanism, arranged along the convey path, for reversing the object.

4 Claims, 27 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 19



---

☐ 16. Document ID: US 5896875 A

L15: Entry 16 of 22 File: USPT Apr 27, 1999

US-PAT-NO: 5896875
DOCUMENT-IDENTIFIER: US 5896875 A

TITLE: Equipment for cleaning, etching and drying semiconductor wafer and its using method

DATE-ISSUED: April 27, 1999

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|---|---|---|---|---|
| Yoneda; Kenji | Kyoto | | | JP |

US-CL-CURRENT: 134/102.3; 134/100.1, 134/102.1, 134/176, 134/179, 134/2, 134/26, 134/3, 134/30, 134/31, 134/37, 134/45, 134/902

ABSTRACT:

An equipment for cleaning, etching and drying a semiconductor wafer is provided with a process chamber having a closed space of which temperature is capable of being heated and adjusted by a heater; a mesh arranged at the center part in the process chamber and supporting at least one semiconductor wafer to be cleaned; a plurality of spray nozzles arranged in line at the upper part in the process chamber; and a rotary discharge nozzle arranged at the lower part in the process chamber. The spray nozzles spray chemical and ultrapure water with nitrogen gas in mist state, and the rotary discharge nozzle blows out chemical and ultrapure water as jet stream by rotation of a first arm and second arms thereof.

11 Claims, 9 Drawing figures
Exemplary Claim Number: 1

Number of Drawing Sheets: 9

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

---

☐ 17. Document ID: US 5518542 A

L15: Entry 17 of 22 File: USPT May 21, 1996

US-PAT-NO: 5518542
DOCUMENT-IDENTIFIER: US 5518542 A

TITLE: Double-sided substrate cleaning apparatus

DATE-ISSUED: May 21, 1996

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|---|---|---|---|---|
| Matsukawa; Hiroyuki | Kumamoto | | | JP |
| Yonemizu; Akira | Kumamoto | | | JP |
| Matsushita; Michiaki | Yatsushiro | | | JP |
| Fujimoto; Akihiro | Kumamoto | | | JP |
| Takekuma; Takashi | Yamaga | | | JP |
| Yaegashi; Hidetami | Kokubunji | | | JP |
| Fukuda; Takahide | Kumamoto | | | JP |

US-CL-CURRENT: 118/52; 118/232, 118/240, 118/244, 118/319, 118/321, 118/323, 118/503, 118/58, 118/642, 118/66, 118/712, 118/72, 118/73, 134/902, 15/77, 15/88.2, 414/936, 414/941

ABSTRACT:

There is provided a double-sided substrate cleaning apparatus including a carrier station for loading/unloading a carrier in which objects to be processed are stored, a convey mechanism for conveying an object taken out from the carrier station, at least one cleaning mechanism, arranged along a convey path on which the convey mechanism conveys the object, for cleaning the object, and an object reversing mechanism, arranged along the convey path, for reversing the object.

23 Claims, 49 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 19

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

---

☐ 18. Document ID: US 5464477 A

L15: Entry 18 of 22 File: USPT Nov 7, 1995

US-PAT-NO: 5464477
DOCUMENT-IDENTIFIER: US 5464477 A

TITLE: Process for cleaning and drying ferrous surfaces without causing flash rusting

DATE-ISSUED: November 7, 1995

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|---|---|---|---|---|
| Awad; Sami B. | Drexel Hill | PA | | |

US-CL-CURRENT: 134/1; 134/2, 134/26, 134/29

ABSTRACT:

The present invention relates to an aqueous composition and process useful for cleaning and drying ferrous surfaces. According to the invention, a water-immiscible hydrocarbon or non-halogenated organic solvent cleaning step is followed by an aqueous displacement solution (ADS) which contains a surfactant component and a pH modifier component in sufficient amounts to substantially displace the hydrophobic organic solvent residue from the surface of the substrate and prevent its redeposition. The ferrous metal surfaces are then rinsed with hot deionized ultrasonically agitated water which comprises one or more water soluble basic components. This aqueous composition is capable of protecting ferrous metal surfaces form flash rusting after aqueous cleaning or solvent treatments of the surfaces, and particularly during the deionized water rinsing and drying steps.

12 Claims, 0 Drawing figures
Exemplary Claim Number: 1



☐ 19. Document ID: US 5397397 A

L15: Entry 19 of 22 File: USPT Mar 14, 1995

US-PAT-NO: 5397397
DOCUMENT-IDENTIFIER: US 5397397 A

TITLE: Method for cleaning and drying of metallic and nonmetallic surfaces

DATE-ISSUED: March 14, 1995

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|---|---|---|---|---|
| Awad; Sami B. | Drexel Hill | PA | | |

US-CL-CURRENT: 134/1; 134/10, 134/26, 134/28, 134/3, 134/41

ABSTRACT:

The present invention relates to an aqueous composition and improved process useful for cleaning and facilitate drying of various metallic and non-metallic surfaces or components. According to the invention the water-immiscible hydrocarbon or non-halogenated organic solvent cleaning step is followed by an aqueous displacement solution (ADS) which contains a surfactant component and a pH modifier component in sufficient amounts to substantially displace the hydrophobic organic solvent residue from on the surface of the substrate and prevent its redeposition. The improved process is an alternative for replacing the ozone depleting chlorofluorocarbons and Halogenated solvents (ODS) or other volatile organic solvents (VOC) being commonly used in cleaning variety of industrially manufactured metallic and non-metallic components. The present invention provides an effective method for removal of various light and heavy surface contaminants such as, but not limited to, fluxes, oils, waxes, buffing and lapping compounds, finger prints, silicone oils, metal forming lubricants, polymers and mold release compounds.

2 Claims, 0 Drawing figures
Exemplary Claim Number: 1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☐ 20. Document ID: US 5288333 A

L15: Entry 20 of 22 File: USPT Feb 22, 1994

US-PAT-NO: 5288333
DOCUMENT-IDENTIFIER: US 5288333 A

TITLE: Wafer cleaning method and apparatus therefore

DATE-ISSUED: February 22, 1994

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|---|---|---|---|---|
| Tanaka; Masato | Hikone | | | JP |
| Nishizawa; Hisao | Hikone | | | JP |
| Hirai; Nobuyuki | Hikone | | | JP |
| Shinbara; Kaoru | Hikone | | | JP |
| Yoshioka; Hitoshi | Hikone | | | JP |

US-CL-CURRENT: 134/31; 134/11, 134/12, 134/30, 134/37

ABSTRACT:

A wafer cleaning method and apparatus in which a cleaning solution is caused to evaporate at a temperature below its boiling point, and cleaning vapor thus produced is applied at a temperature above its dew point to a wafer such as a semiconductor wafer. The wafer is cleaned without formation of colloidal silica in the absence of aerosol, or etched uniformly free of impurities. The wafer cleaning apparatus comprises a cleaning solution storage, a vapor generating section, a wafer supporting position of a wafer supporting device and a vapor supply section. These components are arranged in a housing to overlap one another in plan view and to lie vertically close to one another. The apparatus has a compact overall construction with simplified seals for preventing leakage of the cleaning vapor.

12 Claims, 14 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 11

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

Generate Collection Print

| Term | Documents |
|---|---|
| 134/2.EPAB,JPAB,USPT,PGPB. | 1895 |
| 134/2S | 0 |
| 134/3.EPAB,JPAB,USPT,PGPB. | 1916 |
| 134/3S | 0 |
| 134/19.EPAB,JPAB,USPT,PGPB. | 616 |
| 134/19S | 0 |
| 134/26.EPAB,JPAB,USPT,PGPB. | 1111 |
| 134/26S | 0 |
| 134/30.EPAB,JPAB,USPT,PGPB. | 935 |
| 134/30S | 0 |
| 134/33.EPAB,JPAB,USPT,PGPB. | 475 |
| (L14 AND ((134/2 OR 134/3 OR 134/19 OR 134/26 OR 134/30 OR 134/33 OR 134/37 OR 134/902).CCLS.)).USPT,PGPB,JPAB,EPAB,DWPI,TDBD. | 22 |

There are more results than shown above. Click here to view the entire set.

**Display Format:** - Change Format

Previous Page Next Page

# WEST Search History

DATE: Friday, November 22, 2002

| Set Name side by side | Query | Hit Count | Set Name result set |
|---|---|---|---|
| *DB=USPT,PGPB,JPAB,EPAB,DWPI,TDBD; PLUR=YES; OP=ADJ* | | | |
| L15 | L14 and ((134/2 or 134/3 or 134/19 or 134/26 or 134/30 or 134/33 or 134/37 or 134/902).ccls.) | 22 | L15 |
| L14 | L13 and (cleaning or removing) | 64 | L14 |
| L13 | L12 and rotat$ | 72 | L13 |
| L12 | L11 and film | 139 | L12 |
| L11 | L10 and ozone | 169 | L11 |
| L10 | l3 and heating | 2703 | L10 |
| L9 | l4 and rotating | 1 | L9 |
| L8 | l4 and ozone | 0 | L8 |
| L7 | L6 and ozone | 0 | L7 |
| L6 | l3 and (heated solution) | 20 | L6 |
| *DB=USPT; PLUR=YES; OP=ADJ* | | | |
| L5 | l3 and (heated solution) | 17 | L5 |
| L4 | l2 and (heated solution) | 17 | L4 |
| *DB=USPT,PGPB,JPAB,EPAB,DWPI,TDBD; PLUR=YES; OP=ADJ* | | | |
| L3 | spraying and (wafer or workpiese) | 6114 | L3 |
| *DB=USPT; PLUR=YES; OP=ADJ* | | | |
| L2 | spraying and (wafer or workpiese) | 4257 | L2 |
| L1 | 6358325.pn. | 1 | L1 |

END OF SEARCH HISTORY

WEST

Generate Collection | Print

**Search Results** - Record(s) 21 through 22 of 22 returned.

☐ 21. Document ID: US 5181985 A

L15: Entry 21 of 22 File: USPT Jan 26, 1993

US-PAT-NO: 5181985
DOCUMENT-IDENTIFIER: US 5181985 A

TITLE: Process for the wet-chemical surface treatment of semiconductor wafers

DATE-ISSUED: January 26, 1993

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|---|---|---|---|---|
| Lampert; Ingolf | Burghausen | | | DE |
| Gratzl; Christa | Neuotting | | | DE |

US-CL-CURRENT: 438/748; 134/11, 134/28, 134/31, 134/902, 438/750, 438/753

ABSTRACT:

A process for the wet-chemical surface treatment of semiconductor wafers in which aqueous phases containing one or more chemically active substances in solution act on the wafer surfaces, consisting of spraying a water mist over the wafer surfaces and then introducing chemically active substances in the gaseous state so that these gaseous substances combine with the water mist so that there is an interaction of the gas phase and the liquid phase taking place on the surface of the semiconductor wafer. Gases such as hydrogen fluoride, chlorine and ozonized oxygen or other halogen gases act on the wafer surfaces between rinsing steps so that when the wafers are dried, the surfaces achieve extremely high cleanliness levels.

18 Claims, 0 Drawing figures
Exemplary Claim Number: 1

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 22. Document ID: US 5158100 A

L15: Entry 22 of 22 File: USPT Oct 27, 1992

US-PAT-NO: 5158100
DOCUMENT-IDENTIFIER: US 5158100 A

TITLE: Wafer cleaning method and apparatus therefor

DATE-ISSUED: October 27, 1992

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|---|---|---|---|---|
| Tanaka; Masato | Hikone | | | JP |
| Nishizawa; Hisao | Hikone | | | JP |
| Hirai; Nobuyuki | Hikone | | | JP |
| Shinbara; Kaoru | Hikone | | | JP |
| Yoshioka; Hitoshi | Hikone | | | JP |

US-CL-CURRENT: 134/105; 134/108, 134/902

ABSTRACT:

A wafer cleaning method and apparatus in which a cleaning solution is caused to evaporate at a temperature below its boiling point, and cleaning vapor thus produced is applied at a temperature above its dew point to a wafer such as a semiconductor wafer. The wafer is cleaned without formation of colloidal silica in the absence of aerosol, or etched uniformly free of impurities. The wafer cleaning apparatus comprises a cleaning solution storage, a vapor generating section, a wafer supporting position of a wafer supporting device and a vapor supply section. These components are arranged in a housing to overlap one another in plan view and to lie vertically close to one another. The apparatus has a compact overall construction with simplified seals for preventing leakage of the cleaning vapor.

5 Claims, 14 Drawing figures
Exemplary Claim Number: 3
Number of Drawing Sheets: 11



Generate Collection | Print

| Term | Documents |
|---|---|
| 134/2.EPAB,JPAB,USPT,PGPB. | 1895 |
| 134/2S | 0 |
| 134/3.EPAB,JPAB,USPT,PGPB. | 1916 |
| 134/3S | 0 |
| 134/19.EPAB,JPAB,USPT,PGPB. | 616 |
| 134/19S | 0 |
| 134/26.EPAB,JPAB,USPT,PGPB. | 1111 |
| 134/26S | 0 |
| 134/30.EPAB,JPAB,USPT,PGPB. | 935 |
| 134/30S | 0 |
| 134/33.EPAB,JPAB,USPT,PGPB. | 475 |
| (L14 AND ((134/2 OR 134/3 OR 134/19 OR 134/26 OR 134/30 OR 134/33 OR 134/37 OR 134/902).CCLS.)).USPT,PGPB,JPAB,EPAB,DWPI,TDBD. | 22 |

There are more results than shown above. Click here to view the entire set.

**Display Format:** - Change Format

Previous Page Next Page

WEST

Generate Collection | Print

**Search Results** - Record(s) 1 through 10 of 22 returned.

☐ 1. Document ID: US 20020170573 A1

L15: Entry 1 of 22 File: PGPB Nov 21, 2002

PGPUB-DOCUMENT-NUMBER: 20020170573
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020170573 A1

TITLE: Rinsing processes and equipment

PUBLICATION-DATE: November 21, 2002

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|---|---|---|---|---|
| Christenson, Kurt K. | Minnetonka | MN | US | |
| Nelson, Steven L. | Minnetonka | MN | US | |
| Oikari, James R. | New Brighton | MN | US | |
| Olson, Jeff F. | Burnsville | MN | US | |
| Wu, Biao | Milpitas | CA | US | |

US-CL-CURRENT: 134/2; 134/153, 134/30, 134/33, 134/58R, 134/902, 134/95.2

ABSTRACT:

Described are methods of rinsing and processing devices such as semiconductor wafers wherein the device is rinsed with using a surface tension reducing agent; the method may include a subsequent drying step which preferably incorporates the use of a surface tension reducing agent during at least partial drying; and the method may be performed using automated rinsing equipment; also described are automated rinsing apparatuses useful with the method.

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw. Desc | Image

☐ 2. Document ID: US 20020157686 A1

L15: Entry 2 of 22 File: PGPB Oct 31, 2002

PGPUB-DOCUMENT-NUMBER: 20020157686
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020157686 A1

TITLE: Process and apparatus for treating a workpiece such as a semiconductor wafer

PUBLICATION-DATE: October 31, 2002

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|---|---|---|---|---|
| Kenny, Michael | Kalispell | MT | US | |
| Aegeter, Brian | Kalispell | MT | US | |
| Bergman, Eric | Kalispell | MT | US | |
| Scranton, Dana | Kalispell | MT | US | |

US-CL-CURRENT: 134/1.3; 134/153, 134/21, 134/28, 134/30, 134/33, 134/34, 134/902, 134/95.3

ABSTRACT:

In a system for cleaning a workpiece or wafer, a boundary layer of heated liquid is formed on the workpiece surface. Ozone is provided around the workpiece. The ozone diffuses through the boundary layer and chemically reacts with contaminants on the workpiece surface. A jet of high velocity heated liquid is directed against the workpiece, to physically dislodge or remove a contaminant from the workpiece. The jet penetrates through the boundary layer at the point of impact. The boundary layer otherwise remains largely undisturbed. Preferably, the liquid includes water, and may also include a chemical. Steam may also be jetted onto the workpiece, with the steam also physically removing contaminants, and also heating the workpiece to speed up chemical cleaning. The workpiece and the jet of liquid are moved relative to each other, so that substantially all areas of the workpiece surface facing the jet are exposed at least momentarily to the jet. Sonic or electromagnetic energy may also be introduced to the workpiece.



☐ 3. Document ID: US 20020088478 A1

L15: Entry 3 of 22 File: PGPB Jul 11, 2002

PGPUB-DOCUMENT-NUMBER: 20020088478
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020088478 A1

TITLE: METHOD FOR REMOVING ORGANIC CONTAMINANTS FROM A SEMICONDUCTOR SURFACE

PUBLICATION-DATE: July 11, 2002

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|---|---|---|---|---|
| DEGENDT, STEFAN | WIJNEGEM | | BE | |
| SNEE, PETER | VELTEM-BEISEM | | DE | |

US-CL-CURRENT: 134/3; 134/19, 134/26

ABSTRACT:

A method for removing organic contaminants from a semiconductor surface whereby the semiconductor is held in a tank and the tank is filled with a fluid such as a liquid or a gas. Organic contaminants, such as photoresist, photoresidue, and dry etched residue, occur in process steps of semiconductor fabrication and at times, require removal. The organic contaminants are removed from the semiconductor surface by holding the semiconductor inside a tank. The method may be practiced using gas phase processing or liquid phase processing. The tank is filled with a gas mixture, a liquid, and/or a fluid, such as water, water vapor, ozone and/or an additive acting as a scavenger (a substance which counteracts the unwanted effects of other constituents of the system).

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☐ 4. Document ID: US 20020066464 A1

L15: Entry 4 of 22 File: PGPB Jun 6, 2002

PGPUB-DOCUMENT-NUMBER: 20020066464
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020066464 A1

TITLE: Processing a workpiece using ozone and sonic energy

PUBLICATION-DATE: June 6, 2002

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|---|---|---|---|---|
| Bergman, Eric | Kalispell | MT | US | |

US-CL-CURRENT: 134/1; 134/102.1, 134/107, 134/186, 134/28, 134/30, 134/36, 134/95.2, 134/95.3

ABSTRACT:

An apparatus for processing a semi-conductor wafer or similar workpiece has one or more liquid outlets for applying a heated process liquid to the wafer within a process chamber. Ozone gas is provided into the chamber directly, or via the processed liquid. Sonic energy is introduced to the workpiece through a layer of liquid. In an alternative design, the wafers are immersed in heated process liquid, and an ozone atmosphere is provided above the liquid. The wafers are then lifted out of the liquid, or the liquid is alternatively drained off. The ozone gas/liquid interface passes down across the surfaces of the wafers.

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☐ 5. Document ID: US 20020050279 A1

L15: Entry 5 of 22 File: PGPB May 2, 2002

PGPUB-DOCUMENT-NUMBER: 20020050279
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020050279 A1

TITLE: Process and apparatus for treating a workpiece with hydrofluoric acid and ozone

PUBLICATION-DATE: May 2, 2002

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|---|---|---|---|---|
| Bergman, Eric J. | Kalispell | MT | US | |

US-CL-CURRENT: 134/3; 134/19, 134/2, 134/26, 134/28, 134/30, 134/31, 134/32, 134/33, 134/34, 134/35, 134/41

ABSTRACT:

A workpiece or substrate is placed in a support in a reaction chamber. A heated process liquid is sprayed onto the substrate. The thickness of the layer of process liquid formed on the substrate is controlled, e.g., by spinning the substrate. Ozone is introduced into the reaction chamber by injection into the liquid or into the reaction chamber, while the temperature of the substrate is controlled, to chemically process the substrate. The substrate is then rinsed and dried.

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

---

☐ 6. Document ID: US 20020020436 A1

L15: Entry 6 of 22 File: PGPB Feb 21, 2002

PGPUB-DOCUMENT-NUMBER: 20020020436
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020020436 A1

TITLE: Process and apparatus for treating a workpiece with steam and ozone

PUBLICATION-DATE: February 21, 2002

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|---|---|---|---|---|
| Bergman, Eric J. | Kalispell | MT | US | |

US-CL-CURRENT: 134/30; 134/19, 134/2, 134/26, 134/28, 134/3, 134/31, 134/35, 134/36, 134/37, 134/41, 134/42

ABSTRACT:

In a method for processing a workpiece to remove material from a first surface of the workpiece, steam is introduced onto the first surface under conditions so that at least some of the steam condenses and forms a liquid boundary layer on the first surface. The condensing steam helps to maintain the first surface of the workpiece at an elevated temperature. Ozone is provided around the workpiece under conditions where the ozone diffuses through the boundary layer and reacts with the material on the first surface. The temperature of the first surface is controlled to maintain condensation of the steam.

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC | Draw Desc | Image

---

☐ 7. Document ID: US 20020011257 A1

L15: Entry 7 of 22 File: PGPB Jan 31, 2002

PGPUB-DOCUMENT-NUMBER: 20020011257
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20020011257 A1

TITLE: METHOD FOR REMOVING ORGANIC CONTAMINANTS FROM A SEMICONDUCTOR SURFACE

PUBLICATION-DATE: January 31, 2002

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|---|---|---|---|---|
| DEGENDT, STEFAN | WIJNEGEM | | BE | |
| SNEE, PETER | VELTEM-BEISEM | | BE | |
| HEYNS, MARC | LINDEN | | BE | |
| MERTENS, PAUL | Haacht | | BE | |
| MEURIS, MARC | KEERBERGEN | | BE | |

US-CL-CURRENT: 134/3; 134/2, 134/26, 438/745

ABSTRACT:

A method for removing organic contaminants from a semiconductor surface whereby the semiconductor is held in a tank and the tank is filled with a fluid such as a liquid or a gas. Organic contaminants, such as photoresist, photoresidue, and dry etched residue, occur in process steps of semiconductor fabrication and at times, require removal. The organic contaminants are removed from the semiconductor surface by holding the semiconductor inside a tank. The method may be practiced using gas phase processing or liquid phase processing. The tank is filled with a gas mixture, a liquid, and/or a fluid, such as water, water vapor, ozone and/or an additive acting as a scavenger (a substance which counteracts the unwanted effects of other constituents of the system).



---

☐ 8. Document ID: US 20010042555 A1

L15: Entry 8 of 22 File: PGPB Nov 22, 2001

PGPUB-DOCUMENT-NUMBER: 20010042555
PGPUB-FILING-TYPE: new
DOCUMENT-IDENTIFIER: US 20010042555 A1

TITLE: Apparatus and method for delivering a treatment liquid and ozone to treat the surface of a workpiece

PUBLICATION-DATE: November 22, 2001

INVENTOR-INFORMATION:

| NAME | CITY | STATE | COUNTRY | RULE-47 |
|---|---|---|---|---|
| Bergman, Eric J. | Kalispell | MT | US | |
| Hess, Mignon P. | Kalispell | MT | US | |

US-CL-CURRENT: 134/1.3; 134/102.1, 134/148, 134/153, 134/157, 134/25.4, 134/33, 134/902, 134/95.3

ABSTRACT:

An apparatus for supplying a mixture of a treatment liquid and ozone for treatment of a surface of a workpiece, and a corresponding method are set forth The preferred embodiment of the apparatus comprises a liquid supply line that is used to provide fluid communication between a reservoir containing the treatment liquid and a treatment chamber housing the workpiece. A heater is disposed to heat the workpiece, either directly or indirectly. Preferably, the workpiece is heated by heating the treatment liquid that is supplied to the workpiece. One or more nozzles accept the treatment liquid from the liquid supply line and spray it onto the surface of the workpiece while an ozone generator provides ozone into an environment containing the workpiece.

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☐ 9. Document ID: US 6290777 B1

L15: Entry 9 of 22 File: USPT Sep 18, 2001

US-PAT-NO: 6290777
DOCUMENT-IDENTIFIER: US 6290777 B1

TITLE: Method and device for washing electronic parts member, or the like

DATE-ISSUED: September 18, 2001

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|---|---|---|---|---|
| Imaoka; Takashi | Toda | | | JP |
| Yamashita; Yukinari | Toda | | | JP |

US-CL-CURRENT: 134/1; 134/1.3, 134/2, 134/3

ABSTRACT:

An electronic parts members, or the like, such as the silicon wafer, etc., is washed with wash water. The wash water is prepared by dissolving a hydrogen gas or ozone gas in ultra pure water and has a negative or positive oxidation-reduction potential. This wash water has remarkably improved detergency for electronic parts. In addition, when the pH of the wash water is adjusted, the electronic parts members can be washed more effectively.

26 Claims, 5 Drawing figures
Exemplary Claim Number: 1
Number of Drawing Sheets: 4

Full | Title | Citation | Front | Review | Classification | Date | Reference | Sequences | Attachments | KWIC
Draw Desc | Image

☐ 10. Document ID: US 6273108 B1

L15: Entry 10 of 22 File: USPT Aug 14, 2001

US-PAT-NO: 6273108
DOCUMENT-IDENTIFIER: US 6273108 B1

TITLE: Apparatus and method for processing the surface of a workpiece with ozone

DATE-ISSUED: August 14, 2001

INVENTOR-INFORMATION:

| NAME | CITY | STATE | ZIP CODE | COUNTRY |
|---|---|---|---|---|
| Bergman; Eric J. | Kalispell | MT | | |
| Hess; Mignon P. | Kalispell | MT | | |

US-CL-CURRENT: 134/102.1; 134/103.1, 134/105, 134/111, 134/902, 134/95.3

ABSTRACT:

An apparatus for supplying a mixture of a treatment liquid and ozone for treatment of a surface of a workpiece, and a corresponding method are set forth. The preferred embodiment of the apparatus comprises a liquid supply line that is used to provide fluid communication between a reservoir containing the treatment liquid and a treatment chamber housing the workpiece. A heater is disposed to heat the workpiece, either directly or indirectly. Preferably, the workpiece is heated by heating the treatment liquid that is supplied to the workpiece. One or more nozzles accept the treatment liquid from the liquid supply line and spray it onto the surface of the workpiece while an ozone generator provides ozone into an environment containing the workpiece.

21 Claims, 6 Drawing figures
Exemplary Claim Number: 13
Number of Drawing Sheets: 6



Generate Collection Print

| Term | Documents |
|---|---|
| 134/2.EPAB,JPAB,USPT,PGPB. | 1895 |
| 134/2S | 0 |
| 134/3.EPAB,JPAB,USPT,PGPB. | 1916 |
| 134/3S | 0 |
| 134/19.EPAB,JPAB,USPT,PGPB. | 616 |
| 134/19S | 0 |
| 134/26.EPAB,JPAB,USPT,PGPB. | 1111 |
| 134/26S | 0 |
| 134/30.EPAB,JPAB,USPT,PGPB. | 935 |
| 134/30S | 0 |
| 134/33.EPAB,JPAB,USPT,PGPB. | 475 |
| (L14 AND ((134/2 OR 134/3 OR 134/19 OR 134/26 OR 134/30 OR 134/33 OR 134/37 OR 134/902).CCLS.)).USPT,PGPB,JPAB,EPAB,DWPI,TDBD. | 22 |

There are more results than shown above. Click here to view the entire set.

**Display Format:** - Change Format

Previous Page Next Page